(Vegetable Product Series, No. 37.)
(Dyes and Tans.)

THE

AGRICULTURAL LEDGER.

1897—No. 20.

(Reprint from the Central Provinces Bulletin No. 2.)

AL DYE—MORINDA.

[*DICTIONARY OF ECONOMIC PRODUCTS, Vol. V., Pt. I., M. 651-716.*]

AL CULTIVATION, DYEING AND PRINTING IN THE CENTRAL PROVINCES.

Note by MR. R. S. JOSHI, *Superintendent, Nagpur Experimental Farm, specially deputed by the Commissioner of Settlements and Agriculture, Central Provinces, to investigate the subject in the rural districts of Nagpur.*

Other PAPERS that may be consulted :

The Agricultural Ledger, Nos. 9 of 1895 and 22 of 1896.

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(1) To provide information connected with agriculture or economic products in a form which will admit of its ready transfer to ledgers;

(2) To secure the maintenance of uniform ledgers (on the plan of the Dictionary) in all offices concerned in agricultural subjects throughout India, so that references to ledger entries made in any report or publication may be readily utilised in all offices where ledgers are kept;

(3) To admit of the circulation, in convenient form, of information on any subject connected with agriculture or economic products to officials or other persons interested therein;

(4) To secure a connection between all papers of interest published on subjects relating to economic products and the official Dictionary of Economic Products. With this object the information published in these ledgers will uniformly be given under the name and number of the Dictionary article which they more especially amplify. When the subject dealt with has not been taken up in the Dictionary, the position it very possibly would occupy in future issues of that work will be assigned to it.

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Origin of present inquiry.

Agreeably to the instructions contained in Commissioner's letter No. 4057—163, dated 20th November 1896, I proceeded on tour on the 10th December 1896 to the places where *Al* is being cultivated which are Kalmeshwar, Saoner, Saorgaon, Narkhed, Patansaongi, and Khapa.

Localities where *Al* is cultivate

2. The villages in the Kalmeshwar Circle, where *Al* is found under cultivation, are Koosumbi, Waduna, Khurda, Ubali, Kapri, Saoner, Gujarkhedi, Dudhbardi and Saongi. The villages of Belona, Narkher, Pilapur, Pardi were famous for *Al* cultivation some ten years ago. In these places a few remnants of old trees of *Al* are found here and there on the borders of the fields in a neglected state. A large number of trees are cut up every year for fuel by the cultivators, and the fields are prepared for *juar* and other crops. The places where cloth is dyed are Patansaongi, Kalmeshwar, Saoner, Narkhed and Saorgaon. These places are situated near a river with running water, and have, therefore, become the seats of this industry as water is required in large quantity for dyeing cloth. All dyers use the Aniline

CENTRAL PROVINCES.

colours, and not *Ál*. All of them are in a critical state, owing to the competition amongst themselves for selling their dyed cloth at a cheaper rate. The customers hesitate to pay a high price for cloth dyed with *Ál*, and prefer to purchase at a cheaper rate cloth dyed with Aniline dyes, although these colours fade in a very short time.

Cultivation of *Ál*.

3. *Ál*, which is cultivated in the villages mentioned above, is sold by the cultivators to traders who take it to Mohali, a village in the Bhandara District, Tumsar, Andhalgaon, Gihora, Mehediwada, Seoni, Katori, and Benni. They told me that this *Ál* is used for colouring yarn in those places. A trader from Pandharia in the Bilaspur District took 20 *bojas*, costing R600, in 1896 from a cultivator of Saoner, by name Dharma Parasram, a *Lodhi* by caste and residing at Saoner. The yarn dyed with *Al* is used by the Mahar weavers to serve as red borders for *saris* and *dhotis*. This cultivator, **Dharma Parasram**, also told me that there has been a greater demand for *Ál* during the past two years. The people have taken a liking for the *Ál* dye in preference to Aniline colours. He himself has some fields sown with *Ál* in the villages of Dudhbardi and Saongi.

Inquiry for *Al* stated to be reviving.

4. With reference to Commissioner's endorsement No. 1433—163, dated 2nd May 1896, I submit my notes giving the information referred to in paragraphs 3 and 4 of Dr. Watt's letter.

Forms of the plant met with.

(*a*) ***Forms of the Morinda Plant found.***—The accompanying specimens represent the different forms of **Morinda** marked *Choti-ál*, *Badi-ál* and *Sironj*. *Choti-ál* is a cultivated plant two years old. *Badi-ál* is the specimen of a tree fifty years old, and its height is about 30 feet. *Sironj* is a specimen of a plant the seed of which will produce fruit in the third year.

Reg. Nos. 8908*b*. (Seeds 8910.)

No. 1 is a specimen of *Choti-ál* two years old, the roots of which are just fit for being dug up.

No. 2 *Badi-ál* three years old.

No. 3 *Sironj*, three years old.

8907 *b*, 8906, 8904 8905. (Seeds 8909.)

No. 4 *Badi-ál* tree 30 feet high, the circumference of the stem being 5 feet.

No. 5 specimen of *Sironj*, also a tree 20 feet high, stem 4 feet in circumference.

003 *b*.

When touring with Dr. Watt we did not come across the last-mentioned sample. When I inspected the fields sown with *Badi-ál* at Koosumbi, I found that some plants had fruit and flowers and

CENTRAL PROVINCES

some had not. I, therefore, asked the cultivators the reason for this. The explanation they gave me was, that this form of plant which bears fruits the third year is produced from the seed of *Badi-ál* itself. I was not satisfied with this explanation, and I requested them to show me the trees from which the seed was collected. They were unable to do so, the seed being bought by them. When I arrived at Ubali I found a grove of *Ál* trees in which some trees bore fruits, and some did not. There was also a marked difference in the foliage and colour of the leaves of the tree.

Badi-ál and *Sironj*.

The leaves of the tree with fruit were narrow in comparison with the leaves of the tree which had no fruit, *see Sample (4 and 5)*. On enquiry I was told that the trees in fruit are called *Sironj*, and they are produced from the seed of the *Choti-ál*. The flowering season of this tree is just the same as small *Ál*, while the *Badi-ál* tree flowers in the hot weather. When the seed ripens it is collected from the *Badi-ál* tree as well as *Sironj* trees which are growing together. When this seed is sown plants known as *Badi-ál* are produced which do not bear fruit for five or six years, but the seed of *Sironj* produces seed the third year. There are, therefore, three distinct plants of *Ál*. *Choti-ál* produces seed in two years, *Sironj* in three years, and *Badi-ál* after five or seven years.

Three separate forms of .

(*b*) ***Whether abundant or otherwise.***—I have stated above that the cultivation has decreased, and therefore the fields are not in abundance. In each of the villages noted above, there are not more than 10 acres of *Ál* under cultivation.

Decline in cultivation

(*c*) ***Whether a Shrub or a Tree, in other words, the age and height to which it grows.***—*Choti-ál*, *Sironj* and *Badi-ál*, when cultivated, are in a form of shrub from 1 to 3 feet in height. The big trees are from 20 to 40 feet in height and are, I am told, 30 to 40 years old.

Age and height whi the plant attains.

(*d*) ***Seasons of flowering and of fruiting.***—*Choti-ál* and *Sironj* grown from seed bear flowers in the midddle of August and the fruits ripen in December. *Badi-ál* blossoms in May and June, and its fruit ripens in September, October and November.

Flowers a fruits.

(*e*) ***Whether the roots are collected and sold as a dye-material.***—The roots are collected and sold as a dye-stuff.

Dye.

When I visited Dudhbardi the digging up of the *Badi-ál* plants was proceeding. They were dug up by a *kudali* or pickaxe. One

CENTRAL PROVINCES.

man is able to dig in one day 20′ × 10′ × 2′. When he digs and takes out the roots he separates the small roots from the big ones and places them in different baskets. The roots are sold by *bojas* which is 288lb. The value per *boja* is R25 to 40. As soon as the roots are brought home they are divided according to their size and cut up into small pieces on a block of wood and sorted into three classes—big, middling and small. Small pieces fetch a very high price as it contains more substance and less wood.

Collection and preparation for market.

When sown.

Soil.

Weeding.

Protection of young plants necessary.

(f) ***Season of sowing, nature of soil required, etc.***—*Ál* seed, either of *Choti* or *Badi*, is sown at the beginning of the rains. It requiries *Mooramduyam* soil, *i.e.*, soil containing 60 per cent. of clay. The field should not be water-logged. It is sown by a seed drill lengthwise and crosswise. It is sometimes sown broadcast. The seed of *Badi-ál* being big is sown at the rate of 160lb per acre, and *Choti-ál* seed being small is sown at the rate of 80lb per acre. The seed germinates after 20 days. It requires weeding by hand after a month. Up to November or December two or three weedings take place. A bullock *hoe* cannot be worked as the seed is sown cross-wise. Cattle are not very fond of eating the plants, but during the second year, care has to be taken to ward off the cattle to prevent them from trampling the young plants. *Choti-ál* occupies the field for two years, and *Badi-ál* from three to five years; but this period is extended by one or two years just as it suits the cultivator. The yield of root per acre of *Choti-ál* is 1,160lb and the yield of *Badi-ál* is double that of *Choti-ál*.

Yield.

The forms *Choti-al* and *Badi-al*.

(g) ***Whether two distinctive forms of Al exist.***—A distinction between *Choti* and *Badi-ál* exists in the places visited by me. *Choti-ál* comes to maturity in two years, and *Badi-ál* in from three to five years. *Sironj* comes to maturity in three years, but nobody sows a field of *Sironj* separately.

Supply and demand.

(h) ***Demand for Al.***—If a demand were created, a large quantity of *Ál* would be produced.

Consumption.

(i) ***Consumption of Al.***—The consumption of *Ál* has declined and the cultivators attribute it to a decrease in the demand. The dyers get Aniline colours cheaper, and therefore do not take the trouble of buying *Ál* roots and preparing a dye colour from them, which is a troublesome process.

CENTRAL PROVINCE

(j) Possibility of the adoption of Hummel and Perkin's method of preparing a dye-stuff.—The cultivators will not be able to prepare a dye-stuff, but if a merchant or a firm prepares it and sells it at a cheaper or at least a price equal to that fetched by Alizarine, the dyers will buy it willingly and use it for dyeing the cloth. If the demand is increased, the cultivators will produce the roots in any quantity. The superiority of the *Al* dye is recognized by the dyers as well as by the customers, but the customer is unwilling to loosen his purse, and the dyers, therefore, bring an article to the market which can satisfy the customer.

Position of the Industry as regards cultivators, dyers and the public

I now proceed to give an account of the method of dyeing a cloth with *Al*. This method was described to me by Jagoba Shamoji Rangari of Patansaongi.

Process of dyeing.

(1) ***First Stage.***—The first process consists in steeping the cloth in a solution of sheep's dung for 24 hours, next morning it is washed in running water and spread in the sun for drying, water being sprinkled over it about a dozen times. This process occupies one day. A sample of cloth which has passed through the above process is No. 1. The proportion of sheep dung to water is 1 to 12.

Reg. No. 8 (No. 1).

(2) ***Second Stage.***—Sample No. 1 is steeped six times in a solution consisting of sheep dung 2½lb, *papadkhar* (Sample No. 6) 5lb, castor oil 5lb and water to bring it to the consistency of a liquid, and dried six times, *i.e.*, six coatings of the above solutions are given. The above solution is sufficient to dye 100 yards of cloth. The same cloth is afterwards soaked in a soap solution six times and dried. The solution of soap for 100 yards of cloth is 1½lb Soap (Sample No. 7) and water sufficient to steep the cloth. Sample No. 2 has passed through the above processes and occupies a day or two in preparing it.

Reg. No. 8 (No. 6).

Reg. No. 8 (No. 7).

Reg. No. 8 (No. 2).

(3) ***Third Stage.***—The above sample is next washed in running water and dipped when wet in a solution of myrabolan (2½lb myrabolan powder and water sufficient to dip 100 yards,—only the skin of the fruit is taken and the seeds are thrown away). The cloth is then dried. A sample is appended marked No. 3.

Reg. No. 8 (No. 3)

(4) ***Fourth Stage.***—The cloth is again dipped in a solution of 2lb of alum and dried. No. 4 is given to this sample.

Reg. No. 8 (No. 4).

(5) ***Fifth Stage.***—Sample No. 4 is washed in clean water and dried in the sun. This piece of cloth is then dipped in a copper vessel

MORINDA. — Al Cultivation, Dyeing and Printing

CENTRAL PROVINCES.

containing water and 18lb of powdered *Ál* roots. It is boiled until it bubbles, the cloth being turned up and down while boiling. The cloth after cooling is taken out of the solution and washed and dried.

Reg. No. 8918 (No. 5).

This sample bears No. 5. In order to give the cloth some degree of stiffness, it is dipped in a solution of rice flour *kanji*.

(6) ***Sixth Stage.***—When the cloth is to be printed with any design, No. 3 sample is taken and printed with wooden moulds with an ink made of the following ingredients, *viz.*, 2lb gum, 1lb red ochre (*geru*),

Reg. No. 8911 (No. 8).

1lb sample No. 8 alum, and 10lb water. When the above substances are well mixed, they are passed through a cloth and the ink is ready for use. There are two kinds of ink—red and black. The above

Reg. No. 8919 (No. 6, 6-A, 6-B).

ingredients produce a red ink. The sample is marked 6-A. Black ink is produced thus :—Sulphate of iron 1lb, gum 1lb and 4lb water. The above substances are well mixed and strained.

A sample printed with this ink is marked 6-B in sample 6. This contains several kinds of printed designs with the above two inks.

(7) ***Seventh Stage.***—The printed cloth is lightly washed in clean water and dyed red by the fifth process, when *Jajams* and *Rajayis*

Reg. No. 8920 (No. 7).

are to be prepared. Sample No. 7 is a piece of *Jajam*.

(8) When the cloth is to be used for *Patals* and *Saris* for wearing, the printed cloth is taken and dipped in a solution of 2lb of powdered myrabolans and water, and then dried. It is afterwards dipped in a solution of 2lb of alum and water, and dried. This cloth is then washed in the running water and dried, and then dyed with *Ál* dye with the fifth process. Sample No. 8 has gone through all the above processes.

Specimen No. 9 is of a plant locally called *Dhati*. The flowers of this plant are used for colouring the cloth before it undergoes the

Reg. No. 8921 (No. 9).

fifth process. It produces a yellow colour: by using it a smaller quantity of *Ál* roots is needed to colour the cloth. It is not necessary that cloth to be dyed with *Ál* dye should be dipped in a vat containing the above flowers. The colour obtained from these flowers is simply an adjunct.

With reference to paragraph 3 I submit the botanical specimens of the plant in different stages of its growth :—

No. 10 *Choti-ál* plant 6 months old.

No. 10-A ditto ditto.

No. 11 *Choti-ál* 18 months old fit for digging.

in the Central Provinces. (*R. S. Joshi.*) MORINDA.

CENTRAL PROVINCES.

No. 11-A *Choti-ál* 18 months old fit for digging.
No. 12 *Badi-ál* 6 months old.
No. 12-A ditto ditto.
No. 13 *Badi-ál* 3 years old.
No. 13-A ditto ditto,
No. 14 *Sironj* 3 years old, found in the field of *Badi-ál* from which sample No. 13 is selected.
No. 14-A ditto ditto.
No. 15 old stumps of *Ál* growing in a *juar* field.
No. 15-A ditto ditto.
No. 16 *Badi-ál* tree 30 feet high at Obali.
No. 16-A ditto ditto.
No. 17 ditto ditto Pardi.
No. 17-A ditto ditto.
No. 18. *Sironj* tree growing side by side to No. 16 at Obali.
No. 18-A ditto ditto.

(roots) (*b*) No. 19 and 10lb *Choti-ál* roots.

No. 20, 10lb of *Badi-ál* roots in 3 bags sorted as $\frac{2}{1}^{0}$ small $\frac{2}{2}^{0}$ middling, $\frac{2}{3}^{0}$ big. Reg. Nos.

No. 21. Sample of 5-year old *Badi-ál* roots eaten by worms but which can be used by dyers as well. 8908.

No. 22. 10lb of *Sironj* roots. This is not sorted into grades. 8906.

No. 23. *Badi-ál* seed. 8904.

No. 24. *Choti-ál* seed. 8905.

No. (*c*) As for **Morinda umbellata,** I did not come across the plant, and I am, therefore, unable to collect either a botanical specimen or its roots. 8907. 8903. 8909, 8910.

M. 651-716.

G. I. C. P. O.—No. 332 R. & A.—11-1-38.—2,200—W. B. G.

All communications regarding THE AGRICULTURAL LEDGER should be addressed to the Editor, Dr. George Watt, Reporter on Economic Products to the Government of India, Calcutta.

The objects of this publication (as already stated) are to gradually develop and perfect our knowledge of Indian Agricultural and Economic questions. Contributions or corrections and additions will therefore be most welcome.

In order to preserve a necessary relation to the various Departments of Government, contributions will be classified and numbered under certain series. Thus, for example, papers on Veterinary subjects will be registered under the Veterinary Series; those on Forestry in the Forest Series. Papers of more direct Agricultural or Industrial interest will be grouped according as the products dealt with belong to the Vegetable or Animal Kingdom. In a like manner, contributions on Mineral and Metallic subjects will be registered under the Mineral Series.

This sheet and the title-page may be removed when the subject-matter is filed in its proper place, according to the letter and number shown at the bottom of each page.

NOTICE.

Future issues of this publication placed under either the "Special Veterinary" or "Special Forest Series" will not be included in the annual enumeration. Such papers are printed for Departmental purposes. Their unfortunate inclusion in the system of annual numbering has led recipients of the ordinary issues to think their sets incomplete.

The following pamphlets have already appeared as Special issues, and have been accordingly been furnished to the public :—

1894	. .	Nos. 8, 9, 10, 11, 14, and 15.
1896	. .	No. 8.